

Abstract of the Disclosure

A network (21, 21') is maintained functional in the presence of various faults (120), including physical fiber cuts, transmission impairments, degradation, and failure of equipment modules (120). The network includes a common control and backup channel (36) and fiber loopback protection (22-1, 22-2) or wavelength loopback protection (22-1, 22-2) or both (22-1, 22-2) alone. Systems constructed according to the disclosure are capable of providing a backup channel (34) per wavelength at each node (20) that is equally applicable to type 1 nodes (24), which are capable of providing a backup channel (34) per wavelength, and to type 2 nodes (28) which have a subset of the wavelengths employed in the network.

A network (21, 21') is maintained functional in the presence of a wide range of faults (120), including physical fiber cuts, transmission impairments creating signal quality degradation, and failure of equipment modules (20), for example, transceivers, using a common control and backup channel (36), either alone or in combination with fiber loopback protection (22-1, 22-2) or wavelength loopback protection (λ C), or fiber loopback protection (22-1, 22-2) or wavelength loopback protection (λ C) alone. Systems constructed according to the invention require only a single transceiver (34) per wavelength at each node (20) that accesses that wavelength. The invention is equally applicable to type 1 nodes (24), which drop and add a single, predetermined wavelength, and to type 2 nodes (28) which have the capability to drop and add any subset of the wavelengths employed in the network (21, 21').